General

Guideline Title

Infection. Prevention and control of healthcare-associated infections in primary and community care.

Bibliographic Source(s)

National Clinical Guideline Centre. Infection. Prevention and control of healthcare-associated infections in primary and community care. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. 47 p. (Clinical guideline; no. 139).

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: National Collaborating Centre for Nursing and Supportive Care. Infection control. Prevention of healthcare-associated infections in primary and community care. London (UK): National Institute for Clinical Excellence (NICE); 2003 Jun. 257 p. [292 references]

Recommendations

Major Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Recommendations are marked as [2003], [2003, amended 2012], [2012] or [new 2012]:

- [2003] indicates that the evidence has not been updated and reviewed since 2003.
- [2003, amended 2012] indicates that the evidence has not been updated and reviewed since 2003, but a small amendment has been made to the recommendation.
- [2012] indicates that the evidence has been reviewed but no changes have been made to the recommendation.
- [new 2012] indicates that the evidence has been reviewed and the recommendation has been updated or added.

The Guideline Development Group (GDG) recognised that there is a legal duty to implement some of the recommendations in this guideline in order to comply with legislation. The word 'must' is used in these recommendations and details of the relevant legislation are given in footnotes to the recommendations, which are provided at the end of the "Major Recommendations" field.

The GDG was also aware that the consequences of not implementing some other recommendations on patient safety would be very serious – that is, there would be a greatly increased risk of adverse events, including death. The GDG therefore concluded that the use of the word 'must' in these recommendations is justified, in line with the guidance in chapter 9 of 'The guidelines manual (2009)' (see the "Availability of Companion

Documents" field).

Terms Used in This Guidance

Aseptic technique An aseptic technique ensures that only uncontaminated equipment and fluids come into contact with susceptible body sites. It should be used during any clinical procedure that bypasses the body's natural defences. Using the principles of asepsis minimises the spread of organisms from one person to another.

Direct patient care 'Hands on' or face-to-face contact with patients. Any physical aspect of the healthcare of a patient, including treatments, self-care and administration of medication.

Hand decontamination The use of handrub or handwashing to reduce the number of bacteria on the hands. In this guideline this term is interchangeable with 'hand hygiene'.

Handrub A preparation applied to the hands to reduce the number of viable microorganisms. This guideline refers to handrubs compliant with British standards (BS EN1500; standard for efficacy of hygienic handrubs using a reference of 60% isopropyl alcohol).

Healthcare worker Any person employed by the health service, social services, a local authority or an agency to provide care for a sick, disabled or elderly person.

Healthcare waste In this guideline, healthcare waste refers to any waste produced by, and as a consequence of, healthcare activities.

Personal protective equipment Equipment that is intended to be worn or held by a person to protect them from risks to their health and safety while at work. Examples include gloves, aprons, and eye and face protection.

Standard Principles

General Advice

Everyone involved in providing care should be:

- Educated about the standard principles of infection prevention and control and
- Trained in hand decontamination, the use of personal protective equipment, and the safe use and disposal of sharps. [2012]

Wherever care is delivered, healthcare workers must[1] have available appropriate supplies of:

- Materials for hand decontamination
- Sharps containers
- Personal protective equipment [new 2012]

Educate patients and carers about:

- The benefits of effective hand decontamination
- The correct techniques and timing of hand decontamination
- When it is appropriate to use liquid soap and water or handrub
- The availability of hand decontamination facilities
- Their role in maintaining standards of healthcare workers' hand decontamination [new 2012]

Hand Decontamination

Hands must be decontaminated in all of the following circumstances:

- Immediately before every episode of direct patient contact or care, including aseptic procedures
- Immediately after every episode of direct patient contact or care
- Immediately after any exposure to body fluids
- Immediately after any other activity or contact with a patient's surroundings that could potentially result in hands becoming contaminated
- Immediately after removal of gloves [new 2012]

Decontaminate hands preferably with a handrub (conforming to current British standards[2]), except in the following circumstances, when liquid soap and water must be used:

- When hands are visibly soiled or potentially contaminated with body fluids or
- In clinical situations where there is potential for the spread of alcohol-resistant organisms (such as *Clostridium difficile* or other organisms that cause diarrhoeal illness). [new 2012]

Healthcare workers should ensure that their hands can be decontaminated throughout the duration of clinical work by:

- Being bare below the elbow[3] when delivering direct patient care
- Removing wrist and hand jewellery
- Making sure that fingernails are short, clean, and free of nail polish
- Covering cuts and abrasions with waterproof dressings [new 2012]

An effective handwashing technique involves three stages: preparation, washing and rinsing, and drying. Preparation requires wetting hands under tepid running water before applying liquid soap or an antimicrobial preparation. The handwash solution must come into contact with all of the surfaces of the hand. The hands must be rubbed together vigorously for a minimum of 10–15 seconds, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers. Hands should be rinsed thoroughly before drying with good quality paper towels. [2003]

When decontaminating hands using an alcohol handrub, hands should be free from dirt and organic material. The handrub solution must come into contact with all surfaces of the hand. The hands must be rubbed together vigorously, paying particular attention to the tips of the fingers, the thumbs and the areas between the fingers, until the solution has evaporated and the hands are dry. [2003]

An emollient hand cream should be applied regularly to protect skin from the drying effects of regular hand decontamination. If a particular soap, antimicrobial hand wash, or alcohol product causes skin irritation an occupational health team should be consulted. [2003]

Use of Personal Protective Equipment

Selection of protective equipment must[1] be based on an assessment of the risk of transmission of microorganisms to the patient, and the risk of contamination of the healthcare worker's clothing and skin by patients' blood, body fluids, secretions, or excretions. [2003]

Gloves used for direct patient care:

- Must[1] conform to current European Union (EU) legislation (CE marked [Conformité Européenne or "European Conformity"] as medical gloves for single use)[4] and
- Should be appropriate for the task [new 2012]

Gloves must[1] be worn for invasive procedures, contact with sterile sites and non-intact skin or mucous membranes, and all activities that have been assessed as carrying a risk of exposure to blood, body fluids, secretions, or excretions, or to sharp or contaminated instruments. [2003]

Gloves must[1] be worn as single-use items. They must be put on immediately before an episode of patient contact or treatment and removed as soon as the activity is completed. Gloves must be changed between caring for different patients, and between different care or treatment activities for the same patient. [2003]

Ensure that gloves used for direct patient care that have been exposed to body fluids are disposed of correctly, in accordance with current national legislation[5] or local policies (see section on Waste Disposal, below). [new 2012]

Alternatives to natural rubber latex gloves must be available for patients, carers, and healthcare workers who have a documented sensitivity to natural rubber latex. [2012]

Do not use polythene gloves for clinical interventions. [new 2012]

When delivering direct patient care:

- Wear a disposable plastic apron if there is a risk that clothing may be exposed to blood, body fluids, secretions, or excretions or
- Wear a long-sleeved fluid-repellent gown if there is a risk of extensive splashing of blood, body fluids, secretions, or excretions onto skin or clothing. [2012]

When using disposable plastic aprons or gowns:

- Use them as single-use items, for one procedure or one episode of direct patient care and
- Ensure they are disposed of correctly (see section on Waste Disposal, below). [2012]

Face masks and eye protection must[1] be worn where there is a risk of blood, body fluids, secretions, or excretions splashing into the face and eyes. [2003]

Respiratory protective equipment, for example a particulate filter mask, must[1] be used when clinically indicated. [2003]

Safe Use and Disposal of Sharps

Sharps should[6] not be passed directly from hand to hand, and handling should be kept to a minimum. [2003, amended 2012]

Used standard needles:

- Must not be bent[7] or broken before disposal
- Must not be recapped
  In dentistry, if recapping or disassembly is unavoidable, a risk assessment must be undertaken and appropriate safety devices should be used.[8] [new 2012]

Used sharps must be discarded immediately by the person generating the sharps waste into a sharps container conforming to current standards.[9] [new 2012]

Sharps containers:

- Must[5] be located in a safe position that avoids spillage, is at a height that allows the safe disposal of sharps, is away from public access areas and is out of the reach of children
- Must not[5] be used for any other purpose than the disposal of sharps
- Must not[5] be filled above the fill line
- Must[5] be disposed of when the fill line is reached
- Should be temporarily closed when not in use
- Should be disposed of every 3 months even if not full, by the licensed route in accordance with local policy [new 2012]

Use sharps safety devices if a risk assessment has indicated that they will provide safer systems of working for healthcare workers, carers, and patients. [new 2012]

Train and assess all users in the correct use and disposal of sharps and sharps safety devices. [new 2012]

Waste Disposal

Healthcare waste must be segregated immediately by the person generating the waste into appropriate colour-coded storage or waste disposal bags or containers defined as being compliant with current national legislation[5] and local policies. [new 2012]

Healthcare waste must be labelled, stored, transported, and disposed of in accordance with current national legislation[5] and local policies. [new 2012]

Educate patients and carers about the correct handling, storage, and disposal of healthcare waste. [new 2012]

Long-term Urinary Catheters

Education of Patients, their Carers, and Healthcare Workers

Patients and carers should be educated about and trained in techniques of hand decontamination, insertion of intermittent catheters where applicable, and catheter management before discharge from hospital. [2003]

Community and primary healthcare workers must be trained in catheter insertion, including suprapubic catheter replacement and catheter maintenance. [2003]

Follow-up training and ongoing support of patients and carers should be available for the duration of long-term catheterisation. [2003]

Assessing the Need for Catheterisation

Indwelling urinary catheters should be used only after alternative methods of management have been considered. [2003]

The patient's clinical need for catheterisation should be reviewed regularly and the urinary catheter removed as soon as possible. [2003]

Catheter insertion, changes, and care should be documented. [2003]

Catheter Drainage Options

Following assessment, the best approach to catheterisation that takes account of clinical need, anticipated duration of catheterisation, patient preference, and risk of infection should be selected. [2003]

Intermittent catheterisation should be used in preference to an indwelling catheter if it is clinically appropriate and a practical option for the patient. [2003]

Offer a choice of either single-use hydrophilic or gel reservoir catheters for intermittent self-catheterisation. [new 2012]

Select the type and gauge of an indwelling urinary catheter based on an assessment of the patient's individual characteristics, including:

- Age
- Any allergy or sensitivity to catheter materials
- Gender
- History of symptomatic urinary tract infection
- Patient preference and comfort
- Previous catheter history
- Reason for catheterisation [new 2012]

In general, the catheter balloon should be inflated with 10 ml of sterile water in adults and 3–5 ml in children. [2003]

In patients for whom it is appropriate, a catheter valve may be used as an alternative to a drainage bag. [2003]

Catheter Insertion

All catheterisations carried out by healthcare workers should be aseptic procedures. After training, healthcare workers should be assessed for their competence to carry out these types of procedures. [2003]

Intermittent self-catheterisation is a clean procedure. A lubricant for single-patient use is required for non-lubricated catheters. [2003]

For urethral catheterisation, the meatus should be cleaned before insertion of the catheter, in accordance with local guidelines/policy. [2003]

An appropriate lubricant from a single-use container should be used during catheter insertion to minimise urethral trauma and infection. [2003]

Catheter Maintenance

Indwelling catheters should be connected to a sterile closed urinary drainage system or catheter valve. [2003]

Healthcare workers should ensure that the connection between the catheter and the urinary drainage system is not broken except for good clinical reasons (for example changing the bag in line with the manufacturer's recommendations). [2003]

Healthcare workers must decontaminate their hands and wear a new pair of clean, non-sterile gloves before manipulating a patient's catheter, and must decontaminate their hands after removing gloves. [2003]

Patients managing their own catheters, and their carers, must be educated about the need for hand decontamination[10] before and after manipulation of the catheter, in accordance with the recommendations in the Standard Principles section, above. [2003, amended 2012]

Urine samples must be obtained from a sampling port using an aseptic technique. [2003]

Urinary drainage bags should be positioned below the level of the bladder, and should not be in contact with the floor. [2003]

A link system should be used to facilitate overnight drainage, to keep the original system intact. [2003]

The urinary drainage bag should be emptied frequently enough to maintain urine flow and prevent reflux, and should be changed when clinically indicated. [2003]

The meatus should be washed daily with soap and water. [2003]

To minimise the risk of blockages, encrustations, and catheter-associated infections for patients with a long-term indwelling urinary catheter:

- Develop a patient-specific care regimen.
- Consider approaches such as reviewing the frequency of planned catheter changes and increasing fluid intake.
- Document catheter blockages. [new 2012]

Bladder instillations or washouts must not be used to prevent catheter-associated infections. [2003]

Catheters should be changed only when clinically necessary or according to the manufacturer's current recommendations. [2003]

When changing catheters in patients with a long-term indwelling urinary catheter:

- Do not offer antibiotic prophylaxis routinely.
- Consider antibiotic prophylaxis[11] for patients who:
  - Have a history of symptomatic urinary tract infection after catheter change or
  - Experience trauma[12] during catheterisation [new 2012]

Enteral Feeding

Education of Patients, Their Carers, and Healthcare Workers

Patients and carers should be educated about and trained in the techniques of hand decontamination, enteral feeding and the management of the administration system before being discharged from hospital. [2003]

Healthcare workers should be trained in enteral feeding and management of the administration system. [2003]

Follow-up training and ongoing support of patients and carers should be available for the duration of home enteral tube feeding. [2003]

Preparation and Storage of Feeds

Wherever possible pre-packaged, ready-to-use feeds should be used in preference to feeds requiring decanting, reconstitution, or dilution. [2003]

The system selected should require minimal handling to assemble, and be compatible with the patient's enteral feeding tube. [2003]

Effective hand decontamination must be carried out before starting feed preparation. [2003]

When decanting, reconstituting, or diluting feeds, a clean working area should be prepared and equipment dedicated for enteral feed use only should be used. [2003]

Feeds should be mixed using cooled boiled water or freshly opened sterile water and a no-touch technique. [2003]

Feeds should be stored according to the manufacturer's instructions and, where applicable, food hygiene legislation. [2003]

Where ready-to-use feeds are not available, feeds may be prepared in advance, stored in a refrigerator, and used within 24 hours. [2003]

Administration of Feeds

Use minimal handling and an aseptic technique to connect the administration system to the enteral feeding tube. [new 2012]

Ready-to-use feeds may be given for a whole administration session, up to a maximum of 24 hours. Reconstituted feeds should be administered over a maximum 4-hour period. [2003]

Administration sets and feed containers are for single use and must be discarded after each feeding session. [2003]

Care of Insertion Site and Enteral Feeding Tube

The stoma should be washed daily with water and dried thoroughly. [2003]

To prevent blockages, flush the enteral feeding tube before and after feeding or administering medications using single-use syringes or single-patient-use (reusable) syringes according to the manufacturer's instructions. Use:

- Freshly drawn tap water for patients who are not immunosuppressed
- Either cooled freshly boiled water or sterile water from a freshly opened container for patients who are immunosuppressed [new 2012]

Vascular Access Devices

Education of Patients, Their Carers, and Healthcare Workers

Before discharge from hospital, patients and their carers should be taught any techniques they may need to use to prevent infection and safely manage a vascular access device[13]. [2003, amended 2012]

Healthcare workers caring for a patient with a vascular access device[13] should be trained, and assessed as competent, in using and consistently adhering to the infection prevention practices described in this guideline. [2003, amended 2012]

Follow-up training and support should be available to patients with a vascular access device[13] and their carers. [2003, amended 2012]

General Asepsis

Hands must be decontaminated (see section on Hand Decontamination, above) before accessing or dressing a vascular access device. [new 2012]

An aseptic technique[14] must be used for vascular access device catheter site care and when accessing the system. [new 2012]

Vascular Access Device Site Care

Decontaminate the skin at the insertion site with chlorhexidine gluconate[15] in 70% alcohol before inserting a peripheral vascular access device or a peripherally inserted central catheter. [new 2012]

Use a sterile transparent semipermeable membrane dressing to cover the vascular access device insertion site. [new 2012]

Consider a sterile gauze dressing covered with a sterile transparent semipermeable membrane dressing only if the patient has profuse perspiration, or if the vascular access device insertion site is bleeding or oozing. If a gauze dressing is used:

- Change it every 24 hours, or sooner if it is soiled and
- Replace it with a sterile transparent semi-permeable membrane dressing as soon as possible [new 2012]

Change the transparent semi-permeable membrane dressing covering a central venous access device insertion site every 7 days, or sooner if the dressing is no longer intact or moisture collects under it. [2012]

Leave the transparent semipermeable membrane dressing applied to a peripheral cannula insertion site in situ for the life of the cannula, provided that the integrity of the dressing is retained. [new 2012]

Dressings used on tunnelled or implanted central venous catheter sites should be replaced every 7 days until the insertion site has healed, unless there is an indication to change them sooner. [2003]

Healthcare workers should ensure that catheter-site care is compatible with catheter materials (tubing, hubs, injection ports, luer connectors, and extensions) and carefully check compatibility with the manufacturer's recommendations. [2003]

Decontaminate the central venous catheter insertion site and surrounding skin during dressing changes using chlorhexidine gluconate[15] in 70% alcohol, and allow to air dry. Consider using an aqueous solution of chlorhexidine gluconate if the manufacturer's recommendations prohibit the use of alcohol with their catheter. [2012]

Individual sachets of antiseptic solution or individual packages of antiseptic-impregnated swabs or wipes should be used to disinfect the dressing site. [2003]

General Principles for Management of Vascular Access Devices

Decontaminate the injection port or vascular access device catheter hub before and after accessing the system using chlorhexidine gluconate[15] in 70% alcohol. Consider using an aqueous solution of chlorhexidine gluconate if the manufacturer's recommendations prohibit the use of alcohol with their catheter. [new 2012]

In-line filters should not be used routinely for infection prevention. [2003]

Antibiotic lock solutions should not be used routinely to prevent catheter-related bloodstream infections (CRBSI). [2003]

Systemic antimicrobial prophylaxis should not be used routinely to prevent catheter colonisation or CRBSI, either before insertion or during the use

of a central venous catheter. [2003]

Preferably, a single lumen catheter should be used to administer parenteral nutrition. If a multilumen catheter is used, one port must be exclusively dedicated for total parenteral nutrition, and all lumens must be handled with the same meticulous attention to aseptic technique. [2003]

Preferably, a sterile 0.9% sodium chloride injection should be used to flush and lock catheter lumens. [2003]

When recommended by the manufacturer, implanted ports or opened-ended catheter lumens should be flushed and locked with heparin sodium flush solutions. [2003]

Systemic anticoagulants should not be used routinely to prevent CRBSI. [2003]

If needleless devices are used, the manufacturer's recommendations for changing the needleless components should be followed. [2003]

When needleless devices are used, healthcare workers should ensure that all components of the system are compatible and secured, to minimise leaks and breaks in the system. [2003]

When needleless devices are used, the risk of contamination should be minimised by decontaminating the access port with either alcohol or an alcoholic solution of chlorhexidine gluconate[15] before and after using it to access the system. [2003]

In general, administration sets in continuous use need not be replaced more frequently than at 72-hour intervals unless they become disconnected or a catheter-related infection is suspected or documented. [2003]

Administration sets for blood and blood components should be changed every 12 hours, or according to the manufacturer's recommendations. [2003]

Administration sets used for total parenteral nutrition infusions should generally be changed every 24 hours. If the solution contains only glucose and amino acids, administration sets in continuous use do not need to be replaced more frequently than every 72 hours. [2003]

Avoid the use of multidose vials, in order to prevent the contamination of infusates. [new 2012]

Notes

[1] In accordance with current health and safety legislation (at the time of publication of the guideline [March 2012]): Health and Safety at Work Act 1974, Management of Health and Safety at Work Regulations 1999, Health and Safety Regulations 2002, Control of Substances Hazardous to Health Regulations 2002, Personal Protective Equipment Regulations 2002, and Health and Social Care Act 2008.

[2] At the time of publication of the guideline (March 2012): BS EN 1500:1997.

[3] For the purposes of this guideline, the guideline development group (GDG) considered bare below the elbow to mean: not wearing false nails or nail polish; not wearing a wrist-watch or stoned rings; wearing shortsleeved garments or being able to roll or push up sleeves.

[4] At the time of publication of the guideline (March 2012): BS EN 455 Parts 1–4 Medical gloves for single use.

[5] For guidance see (at the time of publication of the guideline [March 2012]): Safe management of healthcare waste (2011).

[6] The updated recommendation contains 'should' rather than 'must' (which is in the 2003 guideline) because the GDG considered that this is not covered by legislation (in accordance with the NICE guidelines manual, 2009).

[7] It is acceptable to bend needles when they are part of an approved sharps safety device.

[8] At the time of publication of the guideline (March 2012): UN3291 and BS 7320.

[9] See BS EN ISO 23907:2012.

[10] The text 'Patients managing their own catheters, and their carers, must be educated about the need for hand decontamination…' has replaced 'Carers and patients managing their own catheters must wash their hands…' in the 2003 guideline.

[11] At the time of publication of the guideline (March 2012), no antibiotics have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.

[12] The GDG defined trauma as frank haematuria after catheterisation or two or more attempts of catheterisation.

[13] The updated recommendation contains 'vascular access device' rather than 'central venous catheter'. This change has been made because peripherally inserted catheters were included in the scope of the guideline update.

[14] The GDG considered that Aseptic Non Touch Technique (ANTT™) is an example of an aseptic technique for vascular access device maintenance, which is widely used in acute and community settings and represents a possible framework for establishing standardised guidance on aseptic technique.

[15] In 2012 a safety alert for chlorhexidine was issued related to the risk of adverse events.

Clinical Algorithm(s)

A NICE Pathway on prevention and control of healthcare associated infections is provided at the National Institute for Health and Clinical Excellence (NICE) Web site .

Scope

Disease/Condition(s)

Healthcare-associated infections

Guideline Category

Management

Prevention

Clinical Specialty

Critical Care

Dentistry

Family Practice

Infectious Diseases

Internal Medicine

Nursing

Pediatrics

Preventive Medicine

Urology

Intended Users

Advanced Practice Nurses

Allied Health Personnel

Dentists

Dietitians

Emergency Medical Technicians/Paramedics

Health Care Providers

Hospitals

Nurses

Occupational Therapists

Patients

Physical Therapists

Physician Assistants

Physicians

Public Health Departments

Guideline Objective(s)

To provide guidelines on the prevention and control of healthcare-associated infections in primary and community care

Target Population

- All adults and children receiving healthcare where standard infection control precautions apply in primary and community care
- Healthcare professionals, family members and carers who provide healthcare in primary and community settings

Interventions and Practices Considered

Standard Principles

General Advice

1. Education of patients, their carers, and healthcare personnel about standard principles of infection prevention and control
2. Adequate supplies of liquid soap, alcohol rub, paper towels and sharps bins
3. Education of patients and carers in hand decontamination procedures

Hand Hygiene

1. Hand washing technique using decontamination agents, including liquid soaps and alcohol handrubs
2. Ensuring that hands can be decontaminated throughout duration of clinical work
3. Emollient hand cream to protect hands from the adverse effects of hand decontamination practice

Use of Personal Protective Equipment

1. Gloves
2. Aprons and gowns
3. Facemasks and eye protection
4. Respiratory protection

Use and Disposal of Sharps

1. Use of needle safety devices and safe handling procedures
2. Immediate discarding of used sharps in appropriate waste container
3. Training users in correct use and disposal of sharps

Waste Disposal

1. Segregation of waste into appropriate colour-coded disposal containers
2. Labelling, storage, transport, and disposal of waste in accordance with national and local policies
3. Education of patients and carers about the correct handling, storage, and disposal of healthcare waste

Care of Patients with Long-Term Urinary Catheters (LTC)

1. Education of patients, their carers, and healthcare personnel
2. Assessment of the need for catheterization
3. Selection of catheter type and system (e.g., intermittent vs. indwelling, catheter valve vs. drainage bag)
4. Catheter insertion techniques
    - Insertion of urinary catheters by healthcare personnel
    - Self-catheterisation
5. Catheter maintenance techniques

Care During Enteral Feeding

1. Education of patients, their carers, and healthcare personnel
2. Techniques for preparation and storage of feeds
3. Techniques for administration of feeds
4. Care of insertion site and enteral feeding tube

Care of Patients with Central Venous Catheters

1. Education of patients, their carers, and healthcare personnel
2. Techniques for general asepsis
3. Catheter site care, including use of sterile gauze and tape or sterile transparent semipermeable polyurethane dressings and use of appropriate antiseptic agents for catheter disinfection during dressing changes
4. Standard principles for catheter management
    - Decontamination of injection ports or catheter hubs with alcohol or chlorhexidine gluconate
    - Use of inline filters (not recommended)
    - Use of antibiotic lock solutions (not routinely recommended)
    - Systemic antibiotic prophylaxis (not recommended)
    - Use of a dedicated catheter lumen for parenteral nutrition
    - Use of sterile 0.9% sodium chloride injection or heparin sodium solutions to flush and lock catheter lumens
    - Use of needleless infusion systems
    - Assessment of the optimal interval for the routine replacement of intravenous (IV) administration sets
    - Avoiding the use of multi-dose vials

Major Outcomes Considered

- All cause mortality
- Short- and long-term infection-related mortality
- Short- and long-term infection-related morbidity
- Rates of patients presenting with a healthcare-associated infection or colonisation, such as methicillin-resistant *Staphylococcus aureus* (MRSA)
- Length of time to treat infection
- Infection-related hospital admittance rates
- Short-, medium-, and long-term quality of life
- Rates of needle stick injuries
- Costs (prevention costs net of treatment cost savings)
- Cost-effectiveness

Methodology

Methods Used to Collect/Select the Evidence

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Clinical Literature Search

Systematic literature searches were undertaken to identify evidence within published literature in order to answer the review questions as per The Guidelines Manual (NICE 2009; see the "Availability of Companion Documents" field). Clinical databases were searched using relevant medical subject headings, free-text terms and study type filters where appropriate. Studies published in languages other than English were not reviewed. Where possible, searches were restricted to articles published in English language. All searches were conducted on core databases, MEDLINE, Embase, CINAHL and The Cochrane Library. The additional subject specific database PsychInfo was used for the patient information questions. All searches were updated on 18th April 2011. No papers after this date were considered.

Search strategies were checked by looking at reference lists of relevant key papers, checking search strategies in other systematic reviews and asking the guideline development group (GDG) for known studies. The questions, the study types applied, the databases searched, and the years covered can be found in Appendix F of the full version of the original guideline document.

During the scoping stage, a search was conducted for guidelines and reports on the websites listed below and on organisations relevant to the topic. Searching for grey literature or unpublished literature was not undertaken. All references sent by stakeholders were considered.

- Guidelines International Network database (www.g-i-n.net)
- National Guideline Clearing House (www.guideline.gov)
- NICE (www.nice.org.uk)
- National Institutes of Health Consensus Development Program (consensus.nih.gov)
- National Library for Health (www.library.nhs.uk)

Evidence Synthesis

The Research Fellow:

- Identified potentially relevant studies for each review question from the relevant search results by reviewing titles and abstracts – full papers were then obtained.
- Reviewed full papers against pre-specified inclusion/exclusion criteria to identify studies that addressed the review question in the appropriate population and reported on outcomes of interest (review protocols are included in Appendix E of the full version of the original guideline document)

Inclusion/Exclusion

The inclusion and exclusion criteria were considered according to the PICO (patient, intervention, comparison, and outcome) used in the protocols. See Appendix F of the full version of the original guideline document for full details.

A major consideration in determining the inclusion and exclusion criteria in the protocol was the applicability of the evidence to the guideline population. The GDG decided to exclude certain settings and populations that could not be extrapolated to community settings; these are detailed per review question in the protocols. See "Indirectness," section 3.1.3.10 of the full version of the original guideline document.

Laboratory studies were excluded because the populations used (healthy volunteers, animals, or *in vitro*) and settings are artificial and not comparable to the population the GDG is making recommendations for. These studies would undoubtedly be of very low quality as assessed by Grading of Recommendations Assessment, Development, and Evaluation (GRADE) and therefore randomised controlled trials, cohort studies, or GDG consensus opinion was considered preferable.

Abstracts, posters, reviews, letters/editorials, foreign language publications, and unpublished studies were excluded.

Health Economic Literature Search

Systematic literature searches were also undertaken to identify health economic evidence within published literature relevant to the review questions. The evidence was identified by conducting a broad search relating to the five key areas in the guideline: long-term urinary catheters, vascular access devices, hand decontamination, sharps, and personal protective equipment, in the National Health Service (NHS) Economic

Evaluation Database (NHS EED), the Health Economic Evaluations Database (HEED), and Health Technology Assessment (HTA) databases with no date restrictions. Additionally, the search was run on MEDLINE and Embase, with a specific economic filter, to ensure publications that had not yet been indexed by these databases were identified. This was supplemented by additional searches that looked for economic and quality of life papers specifically relating to asepsis, urinary tract infections, and catheter-related bloodstream infections in the same databases as it became apparent that some papers in this area were not being identified through the first search. Studies published in languages other than English were not reviewed. Where possible, searches were restricted to articles published in English language.

The search strategies for health economics are included in Appendix F of the full version of the original guideline document. All searches were updated on 18th April 2011. No papers published after this date were considered.

The Health Economist:

- Identified potentially relevant studies for each review question from the economic search results by reviewing titles and abstracts – full papers were then obtained.
- Reviewed full papers against pre-specified inclusion/exclusion criteria to identify relevant studies.

Inclusion/Exclusion

Full economic evaluations (studies comparing costs and health consequences of alternative courses of action: cost-utility, cost-effectiveness, cost-benefit, and cost-consequence analyses) and comparative costing studies that addressed the review question in the relevant population were considered as potentially applicable economic evidence.

In the absence of any full economic evaluations, studies that reported cost per hospital, or reported average cost-effectiveness without disaggregated costs and effects, were considered for inclusion on a case by case basis.

Abstracts, posters, reviews, letters/editorials, foreign language publications, and unpublished studies were excluded. Studies judged to be 'not applicable' were excluded (this included studies that took the perspective of a non-Organisation for Economic Co-operation and Development [non-OECD] country).

Remaining studies were prioritised for inclusion based on their relative applicability to the development of this guideline and the study limitations. For example, if a high quality, directly applicable UK analysis was available then other less relevant studies may not have been included. Where exclusions occurred on this basis, this was noted in the relevant section of the full version of the original guideline document.

For more details about the assessment of applicability and methodological quality see the economic evaluation checklist (The Guidelines Manual; NICE 2009).

When no relevant economic analysis was identified in the economic literature review, relevant UK National Health Service unit costs were presented to the GDG to inform discussion of economic considerations.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Overall Quality of Outcome Evidence in Grading of Recommendations Assessment, Development, and Evaluation (GRADE)

High: The Guideline Development Group (GDG) is very confident that the true effect lies close to that of the estimate of the effect.

Moderate: The GDG is moderately confident in the effect estimate. The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different.

Low: The GDG's confidence in the effect estimate is limited. The true effect may be substantially different from the estimate of the effect.

Very low: The GDG has very little confidence in the effect estimate. The true effect is likely to be substantially different from the estimate of effect.

Methods Used to Analyze the Evidence

Meta-Analysis of Randomized Controlled Trials

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

Evidence Synthesis

The Research Fellow:

- Critically appraised relevant studies using the appropriate checklist as specified in The Guidelines Manual (NICE 2009; see the "Availability of Companion Documents" field).
- Extracted key information about the study's methods and results into evidence tables (evidence tables are included in Appendix G of the full version of the original guideline document).
- Generated summaries of the evidence by outcome (included in the relevant chapter write-ups in the full version of the original guideline document):
    - Randomised studies: meta-analysed, where appropriate and reported in GRADE (Grading of Recommendations Assessment, Development, and Evaluation) profiles for clinical studies.
    - Observational studies: data presented as a range of values in GRADE profiles.
    - Qualitative studies: each study summarised in a table (available in Appendix G of the full version of the original guideline document) where possible, and the quality of included studies assessed against the NICE quality checklists for qualitative studies (see The Guidelines Manual; NICE 2009). Key common themes between studies which were relevant to the review question were summarised and presented with a comment of the quality of studies contributing to the themes in the main guideline document. GRADE does not have a system for rating the quality of evidence for qualitative studies or surveys, and therefore there are no GRADE quality ratings for the themes identified.

Methods of Combining Clinical Studies

Data Synthesis for Intervention Reviews

Where possible, meta-analyses were conducted to combine the results of studies for each review question using Cochrane Review Manager (RevMan5) software. Fixed-effects (Mantel-Haenszel) techniques were used to calculate risk ratios (relative risk) for the binary outcomes. The continuous outcomes were analysed using an inverse variance method for pooling weighted mean differences and where the studies had different scales, standardised mean differences were used. Statistical heterogeneity was assessed by considering the chi-squared test for significance at probability (p)<0.1 or an I-squared inconsistency statistic of >50% to indicate significant heterogeneity. Where there was heterogeneity and a sufficient number of studies, sensitivity analyses were conducted based on risk of bias and pre-specified subgroup analyses were carried out as defined in the protocol.

Assessments of potential differences in effect between subgroups were based on the chi-squared tests for heterogeneity statistics between subgroups. If no sensitivity analysis was found to completely resolve statistical heterogeneity then a random effects (DerSimonian and Laird) model was employed to provide a more conservative estimate of the effect.

The means and standard deviations of continuous outcomes were required for meta-analysis. However, in cases where standard deviations were not reported, the standard error was calculated if the p-values or 95% confidence intervals were reported and meta-analysis was undertaken with the mean difference and standard error using the generic inverse variance method in Cochrane Review Manager (RevMan5) software. Where p values were reported as "less than," a conservative approach was undertaken. For example, if p value was reported as "p<0.001," the calculations for standard deviations were based on a p value of 0.001. If these statistical measures were not available then the methods described in section

16.1.3 of the Cochrane Handbook 'Missing standard deviations' were applied as the last resort.

For binary outcomes, absolute differences in event rates were also calculated using the GRADEpro software using total event rate in the control arm of the pooled results.

Appraising the Quality of Evidence by Outcomes

After appropriate pooling of the results for each outcome across all studies, the quality of the evidence for each outcome was evaluated and presented using the GRADE toolbox. The software (GRADEpro) developed by the international GRADE working group was used to record the assessment of the evidence quality for each outcome.

In this guideline, findings were summarised using two separate tables. The "Clinical Study Characteristics" table includes details of the quality assessment. Reporting or publication bias was only taken into consideration in the quality assessment and included in the Clinical Study Characteristics table if it is clear there was a risk of bias. Each outcome was examined separately for the quality elements listed and defined in Table 1 of the full version of the original guideline document and each graded using the quality levels listed in Table 2 of the full version of the original guideline document. The main criteria considered in the rating of these elements are discussed in section 3.1.3.7 of the full version of the original guideline document. Footnotes were used to describe reasons for grading a quality element as having serious or very serious problems. The ratings for each component were summed to obtain an overall quality assessment for each outcome listed in the "Rating Scheme for the Strength of Evidence" field.

The "Clinical Summary of Findings" table in the full version of the original guideline document includes meta-analysed outcome data (where appropriate), an absolute measure of intervention effect (calculated from the summary statistics for the meta-analysed relative measure and the mean control event rate) and the summary of quality of evidence for that outcome. In the Clinical Summary of Findings table, the columns for intervention and control indicate the total of the sample size for continuous outcomes. For binary outcomes such as number of patients with an adverse event, the event rates (n/N: total number of patients with events divided by total number of patients across studies) are shown with percentages (note: this percentage is an output of GRADEpro software. It is not the results of the meta-analysis and is not used in decision making).

After results were pooled, the overall quality of evidence for each outcome was considered. See Section 3.1.3.7 in the full version of the original guideline document for additional detail.

Evidence was also appraised for study limitations, inconsistency, indirectness, and imprecision. See sections 3.1.3.9-3.1.3.11 in the full version of the original guideline document for detail.

Evidence of Cost-Effectiveness

Evidence on cost-effectiveness related to the key clinical issues being addressed in the guideline was sought. The health economist:

- Undertook a systematic review of the economic literature
- Undertook new cost-effectiveness analysis in priority areas
- Critically appraised relevant studies using the economic evaluations checklist as specified in The Guidelines Manual (NICE 2009).
- Extracted key information about the study's methods and results into evidence tables (evidence tables are included in Appendix H in the full version of the original guideline document).
- Generated summaries of the evidence in NICE economic evidence profiles (included in the relevant chapter write-ups in the full version of the original guideline document).

NICE Economic Evidence Profiles

The NICE economic evidence profile has been used to summarise cost and cost-effectiveness estimates. The economic evidence profile shows, for each economic study, an assessment of applicability and methodological quality, with footnotes indicating the reasons for the assessment. These assessments were made by the health economist using the economic evaluation checklist from The Guidelines Manual (NICE 2009). It also shows incremental costs, incremental outcomes (for example, quality-adjusted life-years [QALYs]) and the incremental cost-effectiveness ratio from the primary analysis, as well as information about the assessment of uncertainty in the analysis. See Table 5 in the full version of the original guideline document for more details.

If a non-UK study was included in the profile, the results were converted into pounds sterling using the appropriate purchasing power parity and Hospital and Community Health Services Pay and Prices Inflation Index.

Undertaking New Health Economic Analysis

As well as reviewing the published economic literature for each review question as described above, original economic analysis was undertaken by the Health Economist in priority areas. Priority areas for new health economic analysis were agreed by the Guideline Development Group (GDG) after formation of the review questions and consideration of the available health economic evidence.

Additional data for the analysis was identified as required through additional literature searches undertaken by the Health Economist, and discussion with the GDG. Model structure, inputs and assumptions were explained to and agreed by the GDG members during meetings, and they commented on subsequent revisions.

See Appendix J of the full version of the original guideline document for details of the health economic analysis/analyses undertaken for the guideline.

Cost-Effectiveness Criteria

NICE's report "Social value judgements: principles for the development of NICE guidance" sets out the principles that GDGs should consider when judging whether an intervention offers good value for money.

In general, an intervention was considered to be cost-effective if either of the following criteria applied (given that the estimate was considered plausible):

- The intervention dominated other relevant strategies (that is, it was both less costly in terms of resource use and more clinically effective compared with all the other relevant alternative strategies), or
- The intervention cost less than £20,000 per QALY gained compared with the next best strategy.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Note from the National Guideline Clearinghouse (NGC): This guideline was developed by the National Clinical Guideline Centre (NCGC) on behalf of the National Institute for Health and Clinical Excellence (NICE). See the "Availability of Companion Documents" field for the full version of this guidance.

This guidance was developed in accordance with the methods outlined in the NICE Guidelines Manual 2009 (see the "Availability of Companion Documents" field).

Amendments to 2003 Text

All text and recommendations from the previous guideline that have not been updated (therefore review questions have not been generated and evidence has not been searched for) have been left unchanged. Amendments to recommendations are detailed in Appendix D.10 of the full version of the original guideline document. Exceptions are documented in section 3.1.1. in the full version of the original guideline document.

Who Developed This Guideline

A multidisciplinary guideline development group (GDG) comprising professional group members and consumer representatives of the main stakeholders developed this guideline. The group met every 4 to 6 weeks during the development of the guideline.

The NCGC team working on the guideline included a project manager, systematic reviewers, health economists, and information scientists. They undertook systematic searches of the literature, appraised the evidence, conducted meta-analysis and cost-effectiveness analysis where appropriate, and drafted the guideline in collaboration with the GDG.

Developing the Review Questions and Outcomes

Review questions were developed in a PICO framework (patient, intervention, comparison, and outcome) for intervention reviews. For qualitative reviews the SPICE framework (setting, population, intervention, comparison, and evaluation methods) was used. This was to guide the literature searching process and to facilitate the development of recommendations by the GDG. They were drafted by the NCGC technical team and refined and validated by the GDG. The questions were based on the key clinical areas identified in the scope (see Appendix A of the full version of the original guideline document). Further information on the outcome measures is shown in section 3.1.2 in the original guideline document and detailed

in the review protocols (see Appendix E of the full version of the original guideline document).

Developing Recommendations

Over the course of the guideline development process, the GDG was presented with:

- Evidence tables of the clinical and economic evidence reviewed from the literature. All evidence tables are in Appendix G and H of the full version of the original guideline document.
- Summary of clinical and economic evidence and quality (as presented in chapters 5 to 12 in the full version of the original guideline document)
- Forest plots (Appendix I of the full version of the original guideline document)
- A description of the methods and results of the cost-effectiveness analysis undertaken for the guideline (Appendix J of the full version of the original guideline document)

Recommendations were drafted on the basis of the GDG interpretation of the available evidence, taking into account the balance of benefits and harms, quality of evidence, and costs. When clinical and economic evidence was of poor quality, conflicting or absent, the GDG drafted recommendations based on consensus. Expert advisors were invited to provide advice on how to interpret the identified evidence. The considerations for making consensus based recommendations include the balance between potential harms and benefits, economic or implications compared to the benefits, current practices, recommendations made in other relevant guidelines, patient preferences, and equality issues. The consensus recommendations were made through discussions in the GDG, or methods of formal consensus were applied. Formal consensus methods used in this guideline included voting at the GDG or anonymous voting via email. The GDG Chair ensured sufficient time for responding and encouraged all members to express their views. The GDG also considered whether the uncertainty is sufficient to justify delaying making a recommendation to await further research, taking into account the potential harm of failing to make a clear recommendation.

The main considerations specific to each recommendation are outlined in the Evidence to Recommendation Sections preceding the recommendation section in each chapter in the full version of the original guideline document.

Rating Scheme for the Strength of the Recommendations

Not applicable

Cost Analysis

Cost-Utility Analysis: Intermittent Self-Catheterisation (ISC)

Summary of Results

This analysis combines the best available evidence about the costs and consequences of each type of catheter used for intermittent catheterisation. Based on the results of the model, it can be concluded that the small decrease in symptomatic infections associated with single-use gel reservoir and hydrophilic catheters is not enough to justify the large increase in the cost of these catheters compared to multiple use non-coated catheters. As a result, clean multiple use non-coated catheters represent the most cost-effective type of catheter for ISC. This conclusion was robust to a wide range of sensitivity analyses, including the increased probability of urethral complications that may be associated with the use of non-coated catheters. However, multiple use non-coated catheters cease to be the most cost-effective choice when patients use an average of more than two catheters per day. Compliance and behaviour are therefore important factors for healthcare workers to consider when prescribing an ISC regime.

Healthcare workers must also consider other patient-specific situations when deciding which catheter to prescribe. Washing and re-using non-coated catheters may not be an appropriate option for all patients. When clean ISC is not an alternative, gel reservoir catheters may be considered the most cost-effective choice for ISC. If hydrophilic catheters are preferred to gel reservoir catheters, they may also be considered as an option.

For complete information on this cost utility analysis, see Appendix J of the full version of the original guideline document (see the "Availability of Companion Documents" field).

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

The guideline was validated through two consultations.

1. The first draft of the guideline (the full guideline, National Institute for Health and Clinical Excellence [NICE] guideline, and Quick Reference Guide) were consulted with Stakeholders and comments were considered by the Guideline Development Group (GDG).
2. The final consultation draft of the Full guideline, the NICE guideline and the Information for the Public were submitted to stakeholders for final comments.

The final draft was submitted to the Guideline Review Panel for review prior to publication.

The guidance is subject to an eight week public consultation and feedback as part of the quality assurance process and peer review of the document. All comments received from registered stakeholders are responded to in turn and posted on the NICE website when the pre-publication check of the full guideline occurs.

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of evidence supporting the recommendations is not specifically stated.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate prevention and control of healthcare-associated infections in primary and community care

Refer to the full version of the guideline (see the "Availability of Companion Documents" field) for the specific "Trade off between clinical benefits and harms" for individual recommendations.

Potential Harms

- The potential clinical harms of educating patients about hand decontamination are minor (skin irritation, perceived inconvenience).
- Potential harms of frequent handwashing include the effect of continual washing on hands and skin condition (leading to dry cracked hands being more susceptible to increased infections and thus the spread of infection), which may depend on the product used and impact on staff time. Additional harms could include increased numbers of skin allergies from continual handwashing/decontamination, leading to additional occupational health visits.
- Potential harms of hand decontamination with handrub or liquid soap and water are the effect of continual washing on hands and skin condition and the danger of ineffective "over the counter" (not conforming to current European and British Standards) compliant handrubs being used.
- Different types of intermittent urinary catheters are associated with slightly different rates of symptomatic urinary tract infection. Although some of these differences are statistically significant, all are associated with wide and overlapping confidence intervals, conferring a degree of uncertainty as to whether the effect is of clinical significance. The risk ratio for one or more urinary tract infections (UTIs) for hydrophilic vs. single-use non-coated is 0.80 (95% confidence interval [CI] 0.65 – 0.99); gel reservoir vs. single-use non coated is 0.33 (95% 0.11 – 0.97); and multiple-use non-coated vs. single-use non-coated is 0.98 (95% 0.77 – 1.25).
- The guideline development group noted that symptomatic UTI in childhood carries the risk of serious kidney damage in the long-term. There is an absence of evidence related to the use of single- vs. multiple- use non-coated catheters in children, and uncertainty surrounding the real lifetime risk of established renal failure as a result of childhood UTI.
- Antibiotics carry a risk of adverse reaction in individual patients.

- The use of oral/enteral syringes is associated with a risk of infection. The guideline development group did not consider there to be a greater risk associated with one type of syringe compared to the other.
- There is a potential for developing resistance against decontamination solutions used to decontaminate the catheter insertion site and surrounding skin during dressing changes.

Refer to the full version of the guideline for the specific "Trade off between clinical benefits and harms" for individual recommendations.

Qualifying Statements

Qualifying Statements

- This guidance represents the view of the National Institute for Health and Clinical Excellence (NICE), which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. However, the guidance does not override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer, and informed by the summary of product characteristics of any drugs they are considering.
- Implementation of this guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to avoid unlawful discrimination and to have regard to promoting equality of opportunity. Nothing in this guidance should be interpreted in a way that would be inconsistent with compliance with those duties.
- This guideline assumes that all providers of healthcare in primary and community care settings are compliant with current code of practice on preventing and controlling infections. The guideline aims to help build on advice given in the code and elsewhere to improve the quality of care and practice in these areas over and above current standards.
- The Guideline Development Group (GDG) recognises the important contribution that surveillance makes to monitoring infection, but it is not within the scope of this guideline to make specific recommendations about this subject.
- The guideline will assume that prescribers will use a drug's summary of product characteristics to inform decisions made with individual patients. This guideline recommends some drugs for indications for which they do not have a UK marketing authorisation at the date of publication, if there is good evidence to support that use. Where recommendations have been made for the use of drugs outside their licensed indications ('off label use'), these drugs are marked with a footnote in the recommendations.

Implementation of the Guideline

Description of Implementation Strategy

The National Institute for Health and Clinical Excellence (NICE) has developed tools to help organisations implement this guidance. These are available on the NICE Web site ; see also the "Availability of Companion Documents" field).

Key Priorities for Implementation

The following recommendations have been identified as priorities for implementation.

Standard Principles: General Advice

- Everyone involved in providing care should be:
  - Educated about the standard principles of infection prevention and control and
  - Trained in hand decontamination, the use of personal protective equipment, and the safe use and disposal of sharps. [2012]
- Wherever care is delivered, healthcare workers must[1] have available appropriate supplies of:
  - Materials for hand decontamination
  - Sharps containers
  - Personal protective equipment [new 2012]
- Educate patients and carers about:
  - The benefits of effective hand decontamination

- The correct techniques and timing of hand decontamination
- When it is appropriate to use liquid soap and water or handrub
- The availability of hand decontamination facilities
- Their role in maintaining standards of healthcare workers' hand decontamination [new 2012]

Standard Principles for Hand Decontamination

- Hands must be decontaminated in all of the following circumstances:
  - Immediately before every episode of direct patient contact or care, including aseptic procedures
  - Immediately after every episode of direct patient contact or care
  - Immediately after any exposure to body fluids
  - Immediately after any other activity or contact with a patient's surroundings that could potentially result in hands becoming contaminated
  - Immediately after removal of gloves [new 2012]

Long-term Urinary Catheters

- Select the type and gauge of an indwelling urinary catheter based on an assessment of the patient's individual characteristics, including:
  - Age
  - Any allergy or sensitivity to catheter materials
  - Gender
  - History of symptomatic urinary tract infection
  - Patient preference and comfort
  - Previous catheter history
  - Reason for catheterisation [new 2012]
- All catheterisations carried out by healthcare workers should be aseptic procedures. After training, healthcare workers should be assessed for their competence to carry out these types of procedures. [2003]
- When changing catheters in patients with a long-term indwelling urinary catheter:
  - Do not offer antibiotic prophylaxis routinely
  - Consider antibiotic prophylaxis[2] for patients who:
    - Have a history of symptomatic urinary tract infection after catheter change or
    - Experience trauma[3] during catheterisation. [new 2012]

Vascular Access Devices

- Before discharge from hospital, patients and their carers should be taught any techniques they may need to use to prevent infection and safely manage a vascular access device[4]. [2003, amended 2012]
- Healthcare workers caring for a patient with a vascular access device[4] should be trained, and assessed as competent, in using and consistently adhering to the infection prevention practices described in this guideline. [2003, amended 2012]
- Decontaminate the skin at the insertion site with chlorhexidine gluconate in 70% alcohol before inserting a peripheral vascular access device or a peripherally inserted central catheter. [new 2012]

[1] In accordance with current health and safety legislation (at the time of publication of the guideline [March 2012]): Health and Safety at Work Act 1974, Management of Health and Safety at Work Regulations 1999, Health and Safety Regulations 2002, Control of Substances Hazardous to Health Regulations 2002, Personal Protective Equipment Regulations 2002, and Health and Social Care Act 2008.

[2] At the time of publication of the guideline (March 2012), no antibiotics have a UK marketing authorisation for this indication. Informed consent should be obtained and documented.

[3] The guideline development group defined trauma as frank haematuria after catheterisation or two or more attempts of catheterisation.

[4] The updated recommendation contains 'vascular access device' rather than 'central venous catheter'. This change has been made because peripherally inserted catheters were included in the scope of the guideline update.

Implementation Tools

Audit Criteria/Indicators

Clinical Algorithm

Patient Resources

Resources

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Safety

Identifying Information and Availability

Bibliographic Source(s)

National Clinical Guideline Centre. Infection. Prevention and control of healthcare-associated infections in primary and community care. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. 47 p. (Clinical guideline; no. 139).

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2003 Jun (revised 2012 Mar)

Guideline Developer(s)

National Guideline Centre - National Government Agency [Non-U.S.]

Source(s) of Funding

National Institute for Health and Clinical Excellence (NICE)

Guideline Committee

Guideline Development Group

Composition of Group That Authored the Guideline

Guideline Development Group Members (2012): Carol Pellowe (*Chair*), Senior Lecturer Infection Control, Florence Nightingale School of Nursing and Midwifery, King's College, London; Elizabeth Gibbs, Patient member, Member of National Alliance of Childhood Cancer Parents Organisations (NACCPO); Ellie Hayter, Professional Practice Lead, Sussex Community NHS Trust, West Sussex; Zara Head, Nurse Practitioner, Doncaster; Eugenia Lee, General Practitioner, Thamesmead, London; Michael Nevill, Infection Control Lead, British Pregnancy Advisory Service (bpas), Warwickshire; Brian Pullen, Infection Control Manager and Registered Paramedic, South East Coast Ambulance Service; NHS Foundation Trust; Godfrey Smith, Consultant Medical Microbiologist, and Infection Prevention Doctor, Royal Liverpool and Broadgreen University Hospitals NHS Trusts (member until GDG meeting 7); Julian Spinks, General Practitioner, Strood, Kent; Sally Stucke, Consultant Paediatrician (Community Child Health), Wye Valley NHS Trust (formerly Hereford Hospital NHS Trust); Graham Tanner; Patient member, Member of National Concern for Healthcare Infections (NCHI); Sue Wright, Lead Nurse, Infection Prevention and Control, Cornwall and the Isles of Scilly Primary Care Trust, Cornwall

Guideline Development Group Members (2003): Anne Mulhall (*Chair*), Independent Consultant; Robert Pratt, Project Director, Thames Valley University, London; Carol Pellowe, Project Manager, Thames Valley University, London; Godfrey Smith, Honorary Consultant Microbiologist, Royal Liverpool Hospital; Sarah Chieveley Williams, Consultant Anaesthetist, University College Hospital NHS Trust, Harrow; Joe Peters, Consultant Surgeon, Princess Alexandra Hospital, Harlow; PJR Shah, Senior Lecturer in Urology and Consultant Urologist, University College London Hospital NHS Trust

Financial Disclosures/Conflicts of Interest

At the start of the guideline development process all guideline development group members declared interests including consultancies, fee-paid work, share-holdings, fellowships, and support from the healthcare industry. At all subsequent guideline development group meetings, members declared arising conflicts of interest, which were also recorded. Members were either required to withdraw completely or for part of the discussion if their declared interest made it appropriate. The details of declared interests and the actions taken are shown in Appendix B of the full version of the original guideline document. For this guideline, no interests were declared that required any actions.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: National Collaborating Centre for Nursing and Supportive Care. Infection control. Prevention of healthcare-associated infections in primary and community care. London (UK): National Institute for Clinical Excellence (NICE); 2003 Jun. 257 p. [292 references]

Guideline Availability

Electronic copies: Available from the National Institute for Health and Clinical Excellence (NICE) Web site .

Availability of Companion Documents

The following are available:

- Infection: prevention and control of healthcare-associated infections in primary and community care. Full guideline. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. 240 p. (Clinical guideline; no. 139). Electronic copies: Available in Portable Document Format (PDF) from the National Institute for Health and Clinical Excellence (NICE) Web site .
- Infection: prevention and control of healthcare-associated infections in primary and community care. Appendices to full version. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. (Clinical guideline; no. 139). Electronic copies: Available in

PDF from the NICE Web site.

- Infection: prevention and control of healthcare-associated infections in primary and community care. Clinical audit tools. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. (Clinical guideline; no. 139). Electronic copies: Available from the NICE Web site.
- Infection: prevention and control of healthcare-associated infections in primary and community care. Costing statement. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. 11 p. (Clinical guideline; no. 139). Electronic copies: Available in PDF from the NICE Web site.
- Infection: prevention and control of healthcare-associated infections in primary and community care. Baseline assessment tool. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. (Clinical guideline; no. 139). Electronic copies: Available from the NICE Web site.
- Prevention and control of healthcare-associated infections overview. NICE pathway. London (UK): National Institute for Health and Clinical Excellence (NICE); 2012 Mar. (Clinical guideline; no. 139). Electronic copies: Available from the NICE Web site.
- The guidelines manual 2009. London (UK): National Institute for Health and Clinical Excellence (NICE); 2009 Jan. Electronic copies: Available in Portable Document Format (PDF) from the NICE Archive Web site.

Patient Resources

The following is available:

- Preventing infections in people having treatment or care at home or in the community. Understanding NICE guidance. Information for people who use NHS services. 2012 Mar. 12 p. Available in Portable Document Format [PDF] format from the National Institute for Health and Clinical Excellence (NICE) Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC Status

This NGC summary was completed by ECRI on January 6, 2005. The information was verified by the guideline developer on July 12, 2005. This summary was updated by ECRI Institute on June 22, 2007 following the U.S. Food and Drug Administration (FDA) advisory on heparin sodium injection. This summary was updated by ECRI Institute on March 13, 2008 following the updated FDA advisory on heparin sodium injection. This summary was updated by ECRI Institute on June 14, 2012. This summary was updated by ECRI Institute on March 6, 2014 following the U.S. Food and Drug Administration advisory on Over-the-Counter Topical Antiseptic Products.

The National Institute for Health and Clinical Excellence (NICE) has granted the National Guideline Clearinghouse (NGC) permission to include summaries of their clinical guidelines with the intention of disseminating and facilitating the implementation of that guidance. NICE has not yet verified this content to confirm that it accurately reflects that original NICE guidance and therefore no guarantees are given by NICE in this regard. All NICE clinical guidelines are prepared in relation to the National Health Service in England and Wales. NICE has not been involved in the development or adaptation of NICE guidance for use in any other country. The full versions of all NICE guidance can be found at www.nice.org.uk.

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